Promotion of biogas and its market development through local and regional partnerships

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Catalogue of Shining Examples

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WP Leader (name, organisation, e-mail, telephone number):
Christian SAKULIN
LandesEnergieVerein Steiermark
c.sakulin@lev.at
T: +43 316 877 3389

Coordinator (name, organisation, e-mail, telephone number):
Reinhard SIX
Rhônalpénergie-Environnement
reinhard.six@raee.org
T: + 33 4 78 37 29 14

1 Introduction

Biogas is the all-rounder among renewable energy sources. It can be used to generate electricity and heat, as a fuel for transport or it can be injected into the natural gas grid. Biogas can be produced from biogenous residues as well as from energy crops specifically planted for the production of biogas.

The biogas technology offers an energy supply with positive aspects for the environment, the region and the agricultural sector. In strong regions, biogas is also regarded as a very interesting stimulant for the economy.

The biogas plants in Europe are very diverse. Many different systems have emerged depending on the regional framework conditions. In some regions, predominantly agricultural biogas plants that use liquid manure and energy crops from the own production to produce the biogas are found. Other regions have concentrated on the use of biogenous residues and commercially/industrially operated biogas plants. Others again prefer the production of fuels from biogas or the construction of CHP plants to generate electricity and heat. The size of the biogas plants in Europe ranges from very small plants (15 kW_{el}) up to large plants (several MW).
Also regionally different are the economic framework conditions. The promotion of electricity from biogas plants takes place either through feed-in-tariffs for the produced or supplied amount of electricity or through green certificates (GC).

The presented documentation of European biogas plants shows a small excerpt about the variety of the success story biogas in Europe. The catalogue is intended to encourage you to think about biogas in your sphere of action and to help portray biogas as an opportunity for the future.

Biogas is and remains an important energy source of future.

2 Overview Table and Information Sheets

see the following pages

Overview table for shining examples of biogas plants – Biogas Regions

Nb.	Name of the biogas plant	Country/ region	Start of operation	Type and origin of feedstock (substrate)	Quantity [tons per year]	Capacity of cogeneration [kW_{el}]	Usage of thermal energy	Usage of electricity
1	Ebersdorf	Austria/ Styria	2004	Liquid pig manure, maize silage, corn-cob-mix, sugar beet chips	18 000	500	residential house, agricultural buildings, further use planned	internal use, feeding into the public grid
2	Gosdorf	Austria/ Styria	2004	liquid pig manure, grass silage, maize, sunflower full crop silage, rye, surface water	6 070 t	500	residential buildings, stables, maize drying plant	internal use, feeding into the public grid
3	Hainersdorf	Austria/ Styria	2005	maize silage, liquid pig manure	2 1000	250	residential buildings, piggery, neighbouring houses	feeding into the public grid
4	Hartberg-Habersdorf	Austria/ Styria	2005	fats/greases (dairy), dairy sludge, Sewage sludge	12 460	124	hygienisation, digester, hall heating	internal use, feeding into the public grid
5	Mureck	Austria/ Styria	2004	liquid pig manure, liquid cattle manure, glycerine phase, maize silage, milled corn cobs, draff	17 000	999	supply of the plant 80% for district heating	feeding into the public grid
6	Saaz	Austria/ Styria	2004	liquid pig manure, grass silage, maize silage, corn-cob-mix, green pruning rye	12 850	500	2 blocks of flats	internal use, feeding into the public grid
7	St. Georgen	Austria/ Styria	2002	liquid pig manure, grass silage, maize silage, milled corn cobs, poultry manure	9 525	330	chicken coop, pigpen, residential house, warm water	internal use, feeding into the public grid
8	St. Stefan im Rosental	Austria/ Styria	2003	liquid pig manure, maize silage, silage grain maize, loppings, apples / pomace, vegetable matter, organic leftovers	10 220	2 x 500	neighbouring stables, 2 blocks of flats, fruit drying plant	internal use, feeding into the public grid
9	Zeltweg	Austria/ Styria	2005	grass silage, maize	12 000	500	federal armed forces	internal use, feeding into the public grid
10	LUTOSA	Belgium/ Hennegau	2002	waste water from potato	1 400 000	2 250	steam is injected in the factory process (washing, peeler, drum,…)	internal use, feeding into the public grid
11	Faascht Farm	Belgium/ Luxemburg	2003	liquid and solid manure (cow, pig), silage maize, wastes from food-industry, grass	12 000	471	5% by farm (dairy facilities), 67.5% by dryer of digestate, 22.5% losses	internal use, feeding into the public grid

Nb.	Name of the biogas plant	Country/ region	Start of operation	Type and origin of feedstock (substrate)	Quantity [tons per year]	Capacity of cogeneration [kW_{el}]	Usage of thermal energy	Usage of electricity
12	Surizénergie	Belgium/ Namur	2006	liquid and solid manure (cow), energy crops (maize, sugar beet,…), grass	4 110	104	heating of 7 houses and 9 flats	internal use, feeding into the public grid
13	GAEC du Bois Joly	France/ Pays de la Loire	2005	solid manure (cattle, rabbit duck and hen) Liquid manure (rabbit)	1 300	30	4 place of anaerobic digestion, tank for liquid of anaerobic digestion, one building from rabbit, 2 houses (farmers are owners)	feeding into the public grid
14	Abbaye de Tamié	France/ Rhône-Alpes	2002	whey, milking waters	5 260	- - -	the biogas is burnt in a gas-fired boiler, to produce warm water for the houses (abbey)	internal use
15	Fier et Nom	France/ Rhône-Alpes	2005	sewage sludge (primary and biologic)	7 665	- - -	neighbouring office	- - -
16	Domaine des Saugealles	Suisse/ Waadt	2007	liquid cattle manure, solid manure (cattle, horses), grass from the city, frying oil, kitchen wastes	2 770	100	heating digester, hygienisation of kitchen wastes, farmer houses warm water for the milking room and the farm, surplus part to dry wood and hay (in project)	internal use, feeding into the public grid
18	Karle	Germany/ Baden-Württemberg	2004	marc of fruits and vegetables, whole plant silage (maize, rye), organic waste (salads, vegetables), rape seed, pig liquid manure, cattle manure, mash and leftovers from fruit juice production	16 900	450	drying of the output of the biogas fertilizer, houses of the owners	internal use, feeding into the public grid
19	Kussmaul	Germany/ Baden-Württemberg	2007	liquid manure (cattle horse and pig),dung, maize silage, marc of apples, grass silage, corn, waste of potato peeling, fat separator, crop clearing, food rests, old bread	17 675	716	hygienisation	feeding into the public grid

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27	Langenau	Germany/ Baden-Württemberg	2006	grass silage, maize silage, grass from landscape maintenance	15 000	3 x 180	50% are used for drying woodchips as fuel wood, for swimming pools	internal use, feeding into the public grid
20	Bad Königshofen	Germany/ Bavaria	2006	maize, grass, total vegetable silage	12 255	625	district heating system (wellness spa)	internal use, feeding into the public grid
21	Wolfring	Germany/ Bavaria	2002	chicken manure (spelt chaff litter), corn Maize silage, grass cuttings, whole plant silage (grain, rape, sunflowers), silo maize silage	10 000		20% green houses, 10% houses, 10 % paintshops, 5% corn drying, 15% woodchips, 10% home requirements	internal use, feeding into the public grid
22	Gehrung	Germany/ Baden-Württemberg	2006	food leftovers, maize, grass silage, liquid manure and dung, offcuts of farming	3 680		hygienisation (70°C), houses and biogas plant, nearly all thermal energy is used	internal use, feeding into the public grid
23	Biowerk Hamburg	Germany/ Hamburg	2006	expired foodstuff, water, mixed waste, oil and fat	23 300	1 021	heat is provided to the nearby stadium, for hot water supply and air conditioning	
24	Engert	Germany/ Hessen	2005	externally procured manure, silo maize, rye, wheat, turnips	12 305	300	in winter the heat is completely used by 10 houses and 2 stables, in summer it is used by 70%	internal use, feeding into the public grid
25	Geveke	Germany/ Lower Saxony	2005	grass silage, maize silage cattle manure, ensiled corn cobs with leaves	14 381		2 houses and machine shop; in the future further 30 houses	internal use, feeding into the public grid
26	Formigara	Italy/ Lombardy	2006	liquid manure, silage (maize and other cereals), triticale milk serum	36 700	1 052	office building of the biogas plant	internal use, feeding into the public grid
27	Azienda Agricola Castello	Italy/ Veneto	2006	liquid manure, silage (maize, sorghum, rye and corn)	6 935	330	- - -	internal use, feeding into the public grid
28	Azienda Agricola La baita del Latte	Italy/ Veneto	2006	liquid manure, silage (maize, sorghum, rye and corn)	25 550	999	houses of the owners, stables	internal use, feeding into the public grid
29	Oczyszczalnia Ścieków	Poland/ Nowy Sacz	2007	Sewage sludge	9 000	345	heating of digesters, own needs	feeding into the public grid

Nb.	Name of the biogas plant	Country/ region	Start of operation	Type and origin of feedstock (substrate)	Quantity [tons per year]	Capacity of cogeneration [kW_{el}]	Usage of thermal energy	Usage of electricity
30	Bioplinarna Farma Ihan	Slovenia/ Osrednje-slovenska regija	1993	liquid pig manure, waste from slaughterhouse industry	91 200	1 052	heating of digesters rooms of biogas plant, thermal treatment	internal use, feeding into the public grid
31	Ljubljana – KOTO	Slovenia/ Osrednje-slovenska regija	2007	liquid cattle manure, bio-waste (source sorted biological waste), bio-waste (organic kitchen waste), wastes from slaughterhouse industry	7 500	526	district heating, steam production	internal use
32	Bioplin Kolar Marjan	Slovenia/ Pomurska regija	2007	liquid pig manure, maize silage, grain maize (corn cob mix), grass silage	14 450	1 000	heating of digesters, pig farm, grain drying plant	internal use, feeding into the public grid
33	Bioplinarna Nemš□ak	Slovenia/ Pomurska regija	2006	liquid pig manure, maize silage, wastes from slaughterhouse industry	86 000	835 + 625	heating of digesters, stables on farm	internal use, feeding into the public grid
34	Bioterm	Slovenia/ Savinjska regija	2003	liquid cattle manure, house organic waste, dairy rest	4 380	60 + 62 + 150	heating of digesters, stable living house, for thermal treatment p	internal use, feeding into the public grid
35	Madrona (Segovia)	Spain/ Castilla y León	2003	sewage sludge	5 200	500 + 500	heating of digesters	internal use
36	Purines de Almazán (Soria)	Spain/ Castilla y León	1994	pig manure	112 500	250	heating of digesters	internal use, feeding into the public grid
37	PORGAPORCS	Spain/ Cataluña	2006	pig manure, sewage sludge, food waste, vegetable oil	15 750	191	heating the farms through radial floor, heating of greenhouse	internal use, feeding into the public grid
38	BIOGEN	UK/ East of England	2006	liquid pig manure, food chain waste from local authorities, food processors, retailers	41 900	1 290	process only	internal use
39	Lowbrook	UK/ South West England	2008	liquid cattle manure, grass/maize silage, poultry litter	12 000	370	process heat, heating of dwellings, and other uses to be found e.g. drying of biomass	internal use, feeding into the public grid
40	Biocycle “Greenfinch”	UK/ West Midlands	2006	household and commercial source-segregated kitchen waste	5 000	315	process heat only	internal use